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**SUBTERRANEAN WARFARE: A COUNTER TO U.S. AIRPOWER**

by

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## *Preface*

Subterranean warfare may be the answer for the enemies of the United States. Over the past 100 years, subterranean warfare has evolved from a tactic to evade potential enemies into an extremely effective and efficient means to counter the effects of superior air power. As the lethality and precision of U.S. munitions increase, our enemies will be forced deeper and deeper into the earth, possibly presenting overwhelming challenges to U.S. Airforce strategists. This research will identify lessons learned from past conflicts and could possibly influence future research and development in tactics and doctrine that will provide future warfighters the necessary tools to combat the tactics of subterranean warfare in the future. I will discuss the evolution of subterranean warfare from its origins to the elaborate tunnel complexes of the Korean and Vietnam conflicts to the underground structures in Iraq used during Desert Storm. I will discuss the implications and importance of the evolution using a simple case study and then evaluate the threats to U.S. interests and finally, discuss the limitations of Airforce doctrine in regard to defeating subterranean structures in the future. It is intended that the research may, in some way, help save the lives of soldiers, sailors, marines and airmen as they support the goals and objectives of the United States military in future conflicts.

I would like to acknowledge the patience, support and guidance from my wife, Rachel, during this academic year. The guidance from my Faculty Research Advisor, LTC Jeff Reilly is also greatly appreciated. His enthusiasm for the subject inspired the investigation.

### *Abstract*

Subterranean warfare has evolved throughout history into what has become a technique for possibly negating the effect of air power. From the ancient underground structures in what is now present day to the heavily defended and fortified bunkers located in Iraq during Desert Storm subterranean warfare has time and time again negated the otherwise overwhelming destructive capability of superior air power. Analysis of warfare leads to several conclusions, as evidenced in the case study of the horrific, bloody fighting during the battle for Peleliu during World War II. During this battle over 10,000 thousand Marines casualties resulted from the fighting in an area 400 yards by 900 yards. Over the years the United States military has encountered subterranean structures and struggled with techniques to destroy these complex systems. Presently, the United States military has no doctrine, tactics, techniques, or procedures for subterranean warfare. The researcher used case study and evaluation of years of warfare, during which the United States' enemies used subterranean tactics to defend territory. The researcher believes that there is a doctrinal void when it comes to engaging subterranean targets. Several propositions of Airpower may have to be reevaluated, based on the premise that our enemies will dig further and further into the earth as a result of U.S Airpower in the future.

## **Part 1**

### **Introduction**

Since the dawn of time man has sought the means to protect himself. Man sought this protection from the environment, initially, as self-preservation became first and foremost in his mind. The elements, after prolonged exposure, would exact devastating effects on the livelihood of man. Shelter provided this basic need for protection in the form of caves and caverns. These subterranean structures provided warmth for the inhabitants, but more importantly provided security from possible attacks from both dangerous wildlife and potential enemies. During this period, man sought the use of these subterranean structures for primarily defensive purposes, devoting most of his time providing for his basic needs of food, shelter, security and protection.

As man evolved, so did his need for protection and security. He realized that the quality of the protection was directly related to the number of people within the structure. Historical accounts from as early as the 5<sup>th</sup> Century BC have shown that underground cities provided a high degree of security for their inhabitants. These underground cities would set the stage for a battlefield tactic that would ultimately cost the lives of tens of thousands of military fighting men.

With the growth of world powers and the ability to wage total war through the use of advanced weapons, such as the rifle, tank, artillery and airplane; the fighting men of militaries throughout the world sought advanced degrees of protection. These underground cities



established the precedence for what would later become a battlefield tactic for armies throughout the next several thousand years.

During the World Wars and the conflicts in Korea, Vietnam, and most recently Desert Storm trench and tunneling tactics and the use of subterranean structures were used extensively in both offensive and defensive operations. In World War II, Army Air Corps and Navy aircraft dropped literally millions of pounds of ordnance onto islands no larger than Rhode Island exacting little or no damage to the underground structures of the Japanese defenders. The tactics used to counter these tunnels and trenches by the Airforce did not vary much even during the Vietnam War, with the execution of Rolling Thunder and Commando Hunt V. American theory dictated that mass (expressed in tonnage of ordnance) alone would break the will of the North Vietnamese people and ensure a victory for the United States. An examination of these operations explains the fact that the principles of airpower do not take into account the effectiveness of subterranean warfare. A detailed examination of these operations will ensure the lessons learned in each of these conflicts with regard to the effectiveness and efficiency of the doctrine is not forgotten.

In the end, an exacting application of the lessons learned in the major conflicts will allow for proposals detailing limitations of current doctrine and the capabilities of airpower in regard to subterranean warfare. Because of the documented historical and unquestioned success of these tactics improved doctrine and tactics need to be researched in order to ensure success in the future with minimal loss of human life.

## **Part 2**

### **Background**

#### **The Evolution of Subterranean Warfare**

##### **Subterranean Warfare prior to World War I**

Our pre-historic ancestors used caves for shelter, defense and as a base of operations. During ancient times subterranean structures were used in both offensive and defensive tactics. The earliest evidence of subterranean structures is found in the writings of Heroditus in the 5<sup>th</sup> Century BC. He could be credited with today what might be classified as a revolution in military affairs or RMA. Heroditus found that his enemies were unable to penetrate the underground dwellings he and his people built. The arrival of the Arab raiding parties in Anotolia in the 7<sup>th</sup> and 8<sup>th</sup> Centuries drove the monks underground and proved to be the catalyst for the construction of the underground cities.<sup>1</sup> These subterranean cities provided not only for the protection from the harshness of the environment, but also a great degree of security from the Arab raiding parties.

During World War I, the quest for terrain proved to be costly; the price paid with human lives. The trench tactics used by all sides proved to be an effective tactic for maintaining position. In the post World War I years, the tactics of tunneling and trench warfare were not fully exploited until the Chinese reintroduced these effective and deadly tactics to modern times.

The Chinese rediscovered the value of tunnels as a military weapon and practiced what is now referred to as Asian Tunnel Warfare.<sup>2</sup> For every counter measure developed by the Japanese the Chinese devised a counter-counter measure. These solutions were primarily developed through trial and error and were ultimately forged in the steel of Chinese lives. The one thread of truth associated with Asian Tunnel Warfare, was that for every counter-measure developed a simple and effective solution was formulated. These solutions proved very costly in terms of human life.<sup>3</sup>

The 1930s in the United States saw the rebuilding of the Army. The doctrine and tactics of the American army were indeed changing with the times; however, the innovations did not reflect nor did the leadership expect to encounter the heavily entrenched and fortified enemies that it would face in the years of warfare in the future.

#### **Subterranean Warfare during WWII**

The United States entered World War II with the unanimity of popular support unprecedented in its military history after the surprise and devastating attack on Pearl Harbor and other bases in Hawaii on December 7, 1941. U.S. forces encountered entrenched forces from both the European Axis and the Asian Axis Powers. As the fighting in and around the entrenchments in the European Theater intensified, the most innovative and deliberate use of caves, tunnels and trenches was in the Pacific area of operations. Although U.S. forces maintained superior numbers, the Japanese delayed and fought bravely inflicting casualties while firmly entrenched in the hills and mountains of the Pacific islands. Extensive and fierce close combat in the caves and tunnels throughout the islands of Biak, Iwo Jima and Rabaul caused casualties for American forces, but none more so than on the islands of Peleliu and Okinawa.

### **Subterranean Warfare during Korea**

During the Korean War, the Chinese Army depended heavily on manpower (due to the shortage of military hardware) and the ruggedness of the Korean terrain. Compensating for its weaknesses in armaments and exploiting the terrain, the Chinese developed a philosophy that would carry them throughout the war. This philosophy of "man over weapons" emphasized the superior ability of the Chinese forces to withstand the harsh environment and overcome crippling weaknesses while achieving remarkable successes in waging war against a technologically superior and well equipped force.<sup>4</sup>

Chinese Communist Forces (CCF) and North Korean resolve was demonstrated by the level of completeness of the trench and tunnel systems in each mountain. Simple tunnels connecting positions evolved into separate, elaborate tunnel complexes with added rooms designed for sleeping, eating and latrine functions. Tunnels large enough for one-quarter ton trucks were built and used for resupplying troops on the front slope. These tunnels systems deep below the surface provided shelter from heavy bombardments. This tactic made judging the numbers of enemy forces impossible for the attacking forces.<sup>5</sup>

The American army emerged from Korea convinced that its vastly superior firepower and equipment could always defeat a poorly equipped Asian army if it was provided the opportunity to deploy them.<sup>6</sup> The U.S. army did learn from the past in terms of its shortcomings in fieldcraft and battle discipline, but believed that our immense firepower and technologically superior equipment would more than compensate for these perceived weaknesses. Colonel John Michaelis of the 27<sup>th</sup> Infantry would later argue that the U.S. Army failed to learn the lessons of Korea. He stated,

I don't think that, as an army or a nation, we ever learn from our mistakes, from history. We didn't learn from the Civil War, we didn't learn from World War I.

The U.S. Army has still not accepted the simple fact that its performance in Korea was lousy.<sup>7</sup>

### **Subterranean Warfare during Vietnam**

In 1962, with the activation of the United States Military Assistance Command, (USMACV), the U.S. attempted to show its resolve in Vietnam. By late 1964, both sides were poised to increase their stake in the war. Regular North Vietnamese Army (NVA) units were staged on the Laotian frontier ready to cross into the Central Highlands. U.S. and naval forces stood ready to renew their attacks. On the 7<sup>th</sup> of February 1965, NVA regulars attacked an American compound in Pleiku. Facing a deteriorating military situation, General Westmoreland developed a strategy of defense centered around the city of Saigon. As units, specifically the 1<sup>st</sup> and 25<sup>th</sup> Infantry Divisions and the 173<sup>rd</sup> Airborne Brigade, began arriving each was assigned a sector and helped the South Vietnamese clear areas suspected of housing Viet Cong insurgents. The first major encounter of the Vietnam War where U.S. forces discovered the tunneling tactics of the Viet Cong was in the area of Cu Chi in the Hau Nghia Province.

**The Tunnels of Cu Chi.** The tunnels, most of which were started during the French occupation of Vietnam, were the most complex part of a network that at the height of the Vietnam War stretched from the gates of Saigon to the border of Cambodia. Hundreds of kilometers of tunnels and caves connecting villages contained living areas, storage depots, ordnance factories, hospitals, headquarters and any other facility necessary to the pursuit of war. General Westmoreland said in his memoirs, "No one has ever demonstrated more ability to hide his installations than the Viet Cong; they were human moles."<sup>8</sup>

The Viet Cong used several defensive tactics during the war. The Viet Cong would only defend the tunnel system on their terms. The tunnels were designed to be defensible. If they were ready to defend then the tactic of holding fire until the last possible moment in order to

inflict severe casualties quickly was used. If not ready, then delaying tactics were used, in order to allow themselves time to evacuate. Once the tunnel was "destroyed" the Viet Cong would return to repair the minimal damage.

The first line of defense of a Viet Cong tunnel was the fear created by mines and boobytraps.<sup>9</sup> Even cleared tunnels provided the opportunity for the VC to inflict casualties as American soldiers searched the complex. This fear delayed U.S. forces and prompted severe morale and discipline problems. Snipers would fire at U.S. forces making them deploy and fight. The deployment of the U.S. forces inhibited the finding or clearance of tunnel systems in the area. The constant threat of snipers caused fear in the American soldiers and often kept them from concentrating on the signs indicating the presence of tunnel systems.

U.S. forces used various countermeasures during the war. U.S. forces conducted sweeps into known VC strongholds forcing direct contact with enemy forces which would eventually lead to discovery of the tunnel systems. Search and Destroy tactics successfully located the tunnels; however, it cost the lives of soldiers executing this mission. Detailed probing evolved as a result of unsuccessful attempts to incorporate differential magnetometers, seismic tunnel detectors, and bulldozer blades.<sup>10</sup> Detailed probing executed by experienced soldiers proved to be successful. This required "experienced" soldiers who were in very short supply in Vietnam. The use of demolitions proved to be of limited value. Once a tunnel complex was discovered usually at the expense of casualties and time hundreds of pounds of explosives would be lowered into the tunnel. The effect of the detonation, although massive, was often deceptive as only the entrance to the tunnel was destroyed, leaving the majority of the tunnel unaffected.<sup>11</sup>

Perhaps the most hazardous job was the job of the "tunnel rat". Originally called "tunnel runners" by the 25<sup>th</sup> Infantry Division, these brave men risked their lives enduring the perils of a

“claustrophobic, dank hell playing a deadly game of hide and seek with the enemy.”<sup>12</sup> Throughout the war there were never many “rats” and although their efforts aided in gaining intelligence and locations of the tunnels the limited number of “rats” never threatened the Viet Cong’s use of the tunnels. The U.S. resorted to the use of extreme measures many of which would be unacceptable practices today. Free fire zones, mass depopulations, herbicidal warfare and land clearing<sup>13</sup> devastated the land and the people, but had limited tactical effect against the tunnels.

Even as recent as Desert Storm underground bunkers were used to diminish the effects of American precision munitions. A steel mill bunker mostly constructed of steel over concrete used as a cafeteria and recreation area was located beneath the steel mill East of Safwan, Iraq. Bunkers below the actual steel mill bunker each with its own independent ventilation shaft were classified the “most secure location in South Iraq” from early September to early December 1990.<sup>14</sup>

Currently in North Korea, the North Koreans have several thousand artillery and heavy mortar positions in heavily fortified positions called HART sites, or hardened artillery sites. In the event of war in the theater these positions facilitate the delivery of rounds on U.S. personnel without the threat of counter-fire from U.S. weapon systems. These positions linked by possible tunnel systems allow the weapons to be fired and then moved into protective cover almost immediately after firing. These positions also are prepared on the reverse slope of the extremely mountainous terrain near the DMZ and afford natural protection augmented by several feet of reinforced concrete. The detection and destruction of these positions will be virtually impossible for the U.S. indirect fire systems.

As a result of fighting in the caves, tunnels and subterranean complexes during World Wars I and II, Korea, Vietnam and Desert Storm and the current intelligence estimates in North Korea and Iraq, several implications for future warfare can be gleaned from the past. Air power has had little or no effect on the subterranean structures used in the past wars. With the advance of technology, the precise targeting, accurate delivery and increased lethality of precision guidance weapons the enemy will be forced deeper and deeper underground than the U.S. has seen in the past. Future enemies will continue to harden existing positions and create new hardened positions designed to withstand indirect barrages and precise engagement by increasingly lethal munitions. This will render air power virtually ineffective in the future. This reality will cause the U.S. a number of problems should it encounter these tactics in the next war. These problems include, but are not limited to: 1) Target location and assessment is difficult, 2) Subterranean fortifications require direct hits by weapons in order to destroy them, 3) Subterranean structures can be repaired and reoccupied at little expense with limited resources, and 4) Battle damage assessment (BDA) is difficult. These problems will be discussed in detail in chapter three.

Throughout history thousands if not hundreds of thousands of Americans have paid the ultimate price while fighting with dated and obsolete tactics and lack of doctrine related to subterranean warfare. History has shown that although air power is powerful and decisive in some circumstances, air power against subterranean structures is not effective. Throughout years of warfare the use of tunneling and cave fighting have proven to be viable defensive tactics. Air power has proven to be of little use when the enemy is below ground in heavily fortified positions.

### Notes

<sup>1</sup> Historical Background, Cappadocia, Turkey, 5 May 1999, on-line, Internet, 5 January 2000, <http://www.hitit.co.uk/tosee/cappy/history.html>,



### Notes

<sup>2</sup> Bruce A. Hanesalo, *Tunnel Warfare, Vol.4 Asian Tunnel Warfare*, A Military/Info Product, 1995, ISBN: 1886848-15-7, 6-8.

<sup>3</sup> *ibid*, 10.

<sup>4</sup> Scott R. McMichael, *A Historical Perspective on Light Infantry*. U.S Army Command and General Staff College, Ft Leavenworth, KS, 1987, 51.

<sup>5</sup> Hanesalo, 63.

<sup>6</sup> Hastings, Max, *The Korean War*, Touchstone, Rockefeller Center, New York, NY, 1987, 334-335.

<sup>7</sup> *ibid*, 334.

<sup>8</sup> Tom Mangold and John Penycate, *The Tunnels of Cu Chi, The Untold Story of Vietnam*. Random House, New York, NY, 1985, 30

<sup>9</sup> Hanesalo, 135.

<sup>10</sup> *ibid*, 136.

<sup>11</sup> *ibid*, 137.

<sup>12</sup> Tunnel Rats: Non Gratum Anus Rodentum. 10 January 2000, on-line, Internet, <http://www.lbjlib.utexas.edu/shwv/articles/tun-rats.htm>,

<sup>13</sup> Hanesalo, 140.

<sup>14</sup> Underground Facilities, 10 January 2000, on-line, Internet, [http://www.gulflink.osd.mil/declassdocs/cia\\_65174\\_65173\\_01.html](http://www.gulflink.osd.mil/declassdocs/cia_65174_65173_01.html),

## Part 3

### Case Study: The Battle for Peleliu



**Figure 1 Gun Emplacement on the island of Peleliu**

*It's just hard to imagine on those small islands where you pile ashore 25,000 men and they've got 10,000, how on earth there's room for them all.*

—General Oliver P. Smith

The Battle for Peleliu is considered the bloodiest of the amphibious assaults. Tenacious Japanese troops defending honeycombed caves made U.S. forces root them out at the expense of frightful losses.<sup>1</sup> The island, prior to the beach assault, had literally been leveled by the tonnage of ordnance dropped from Naval and Army Air Corps aircraft and the Naval guns offshore. After an extremely violent landing, during which the marines suffered heavy casualties, the marines encountered what is considered one of the classic defenses in the history of Asian Tunnel warfare.<sup>2</sup> This defense was unaffected by the immense air power leveled against the

Japanese. As Eugene Sledge stated years after the war, "it was like two scorpions in a bottle, one was annihilated, the other nearly so."<sup>3</sup>

### **Japanese Defensive Tactics.**

The Japanese leadership divided the island into four sectors each defended with a reinforced infantry battalion. This tactic of defending by sector was used on most of the major islands during the war. The intent was to lightly defend at the beach and then conduct a series of counter assaults until they reached the immense labyrinth of tunnels and caves of the Umurbrogol Mountain where the Japanese planned to fight until the last man. Ultimately, the Japanese did defend until the last man, bravely and with a nationalistic fervor that the U.S. had underestimated. It was here the Japanese abandoned their suicidal "banzai" charges in favor of a defense in depth on the island's coral ridges. Ten thousand Marines clashed with an equal number of Japanese in what became a month long blood bath.<sup>4</sup>

### **American Tactics and Lessons.**

The limited success achieved by the marines was through the use of direct fire from heavy artillery and tanks. The constraints of the terrain, the crumbling of the coral sub-terrain and the vertical grade of the cliffs prevented any measurable success. American soldiers eventually captured the island and killed over 95 per cent of the defenders, but the costs did not justify the victory. The U.S. forces were unprepared for the extensive and complex tunnel systems on the island as one marine commented, "Before we left the ship...we could see the island, and it was smoking...The swabbies on board said, 'well you guys can just walk in and take over.' But that certainly wasn't the case."<sup>5</sup>

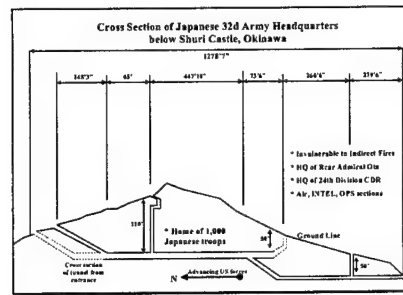
**Target location and Assessment is difficult.** The extremely rough terrain, coupled with the lack of vegetation from the tonnage of ordnance delivered prior to the assault, made the Japanese almost impenetrable. The invasion began with the standard three-day preparation of the battlefield. The Navy fired 2,200 tons of 5" naval gunfire and was effective against above surface buildings and targets, but eventually ran out of targets. The spotters and observers were unable to locate the well-camouflaged Japanese defensive locations.<sup>6</sup> Because of the inability of ground forces to locate the tunnels and cave openings, the overwhelming superiority of fire support was not effective against the subterranean structures or efficient, based on the massive quantities of ordnance delivered and the result. Due to the expert use of the tunnels and caves, particularly the defense of the Umurbrogol Mountain, an assault that should have taken two weeks lasted 68 days. The use of enemy artillery as it would fire then hide in a prepared cave slowed the attack by the marines. The unfamiliarity of subterranean warfare and lack of training in caves and tunnels only added to the confusion and eventual deaths of marines as they attempted to clear the extensive maze of tunnels within the mountain. At one point, "no amount of artillery, naval gunfire, or air attacks seemed to have any effect on the fire coming from the tunnels."<sup>7</sup> The U.S. Marine Corps and later the Army found that destroying the caves and tunnels on Peleliu was an extremely difficult task. Consider that it took 30,000 troops two and a half months to capture an area of land 900 yards by 400 yards with American casualties estimated near 10,000.<sup>8</sup>

**Subterranean fortifications require direct hits by weapons in order to destroy them.** Although the battle is considered a classic combined arms invasion with supporting naval gunfire firing over 2,200 tons of ordnance and over 300 sorties per day dropping 620 tons of ordnance<sup>9</sup>, the effect on the tunnels and the enemy was minimal at best. The marines learned that

supporting weapons such as naval gunfire, artillery and fixed wing close air support had marginal effect against the tunnel systems. Again, the sheer tonnage of ordnance proved ineffective and inefficient. Naval gunfire with its flat trajectory had limited effect and the artillery and mortars had success suppressing the objective area, but proved unsuccessful in destroying the tunnels. Napalm was tried, but only occasionally burned the defenders not inside the caves.

**Battle damage assessment (BDA) is difficult.** Accounts suggest that determining the extensiveness of the cave was virtually impossible. A cave could be a small hole defended by two or the small cave could lead to a complex housing a thousand defenders. This made it impossible to judge how many casualties were being inflicted on the enemy.<sup>10</sup> At the onset of the invasion the marines attempted to attack the fortified caves with direct fire from flame-throwers and hand held explosives often exposing the operator to direct enemy fire. The Japanese defenders would leave only to return and begin the process again. This too made the process of battle damage assessment a moving target. The clearance issue and the size issue dictated that personnel physically clear the caves, a very dangerous and time consuming endeavor. BDA was so difficult, in fact, that after the battle a detailed survey discovered over 500 tunnels most of which were still partially intact.<sup>11</sup>

**Reparability of subterranean positions.** Although Japan had owned the islands for years the only real work on the tunnel complexes started six months prior to the invasion. As advancing U.S. forces swept through the islands the Japanese forces had time to prepare and improve the tunnel systems. Below is an example of the tunnel complex at Umurbrogol Mountain, the 32<sup>nd</sup> Army Headquarters. This complex had matured after only 6 months of extensive work.



**Figure 2. Example of the elaborate system of tunnels used in the Pacific Theater.**

The extensive work paid dividends as the Japanese were able to rebuild tunnels quickly and reoccupy tunnels classified as destroyed by the Marines.

Although the marines assigned the arduous task of securing the island achieved eventual success; the success was entirely due to the inspired and intense perseverance of the 4<sup>th</sup> and 5<sup>th</sup> Marine Divisions. On November 25<sup>th</sup>, Japanese Colonel Kunio Nakagawa sent a radio message to his superiors, "All is over on Peleliu" and he killed himself. Virtually every Japanese soldier stationed on Peleliu died there-10,900 in all. It was a casualty ratio that rivaled every other battle in the Pacific.<sup>12</sup>

### Notes

<sup>1</sup> John M. Collins, *Military Geography*, National Defense University Press, Washington, D.C., 1998, 30-31

<sup>2</sup> Bruce A. Hanesalo, *Tunnel Warfare, Vol.4 Asian Tunnel Warfare*, A Military/Info Product, 1995, ISBN: 1886848-15-7, 29

<sup>3</sup> Eugene Sledge, *With the Old Breed at Peleliu and Okinawa*, Presidio Press, 1981, pg. 12.

<sup>4</sup> Sledge, 15

<sup>5</sup> Beast of Eden, 5 May 1999, on-line, Internet, 5 January 2000, <http://www.discovery.com/area/science/backgrounder.html>.

<sup>6</sup> Hanesalo, 30

<sup>7</sup> *ibid*, 31

<sup>8</sup> *ibid.*, 34

<sup>9</sup> *ibid.*, 29

<sup>10</sup> *ibid.*, 34

<sup>11</sup> *ibid.*, 31

<sup>12</sup> Beast of Eden, 5 May 1999, on-line, Internet, 5 January 2000, <http://www.discovery.com/area/science/backgrounder.html>.

## **Part 4**

### **The Threat – Future Implications**

#### **Economic, Political, and Military Threat – North Korea**

A recent defense report from the Association of the United States Army (AUSA) defining the emerging strategic environment suggested that in order to make a judgement on the nature of future challenges one must understand the future strategic environment itself. In other words, "If you don't know where you're going, any road will take you there." The report further asserts that the world of the next two decades will look very much like the world of today. In a continuation of the "nation-state" system states that pose threats to the U.S. can be divided into three categories. The first is the group of states that are economically, politically and technologically advanced, or the "haves". The second and perhaps most dangerous are the states that possess some potentially dangerous technological advances, powerful for short-ranged military forces, and rather unstable economies.<sup>1</sup> North Korea is considered to be in the second group. The third and the least threat to the United States are the "have-nots". These states have serious economic, population, resource and governmental challenges.

LTG Patrick M. Hughes, Director, Defense Intelligence Agency, identified three principal issues in his testimony before the Senate Select Committee, one of which considers the threat from North Korea as near term.<sup>2</sup> Further evidence supporting the threat North Korea poses to the U.S. is the country's military posture on the ground, deteriorating economic and social

conditions, unstable political situation and the recent use and testing of long range missiles capable of delivering nuclear weapons. All of these coupled with the security concerns over the past years make it imperative that U.S. leadership and intelligence gatherers watch for danger signs.

North Korea has continued to take actions consistent with its avowed "war preparations" campaign designed to give the North the option of unifying the peninsula by force; hence our continued concern with the "explosion"<sup>3</sup>. Over the past year, continued movement of long range artillery and missiles to forward units and the deployment of some aircraft to forward airfields are noteworthy, further limiting our ability to provide adequate warning of North Korean attack. Though we do see diminished readiness in some units, because of shortfalls in training and sustainment, the military posture remains very dangerous.<sup>4</sup>

Additional concerns stem from the internal strife that is rampant in North Korea. The economic problems and the political uncertainty have given rise to the instability and internal unrest in North Korea. The fluid and unstable situation in North Korea warrants scrutiny in order to identify and predict the "implosion" of the country. Its implosion presents an equally dangerous situation for the U.S. should the country look outside its borders for possible solutions to its problems. To further solidify the proposition that the threat from North Korea is real, a defector from the Ministry of the People's Army in 1995 gave these remarks to a hearing before the Subcommittee on International Security, Proliferation and Federal Services in October of 1997:

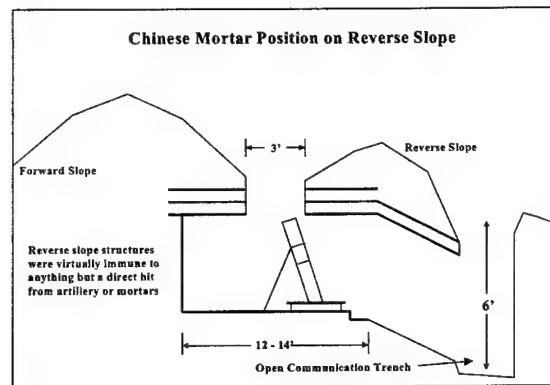
Some Americans believe that even if North Korea possessed the ability to strike the U.S. it would never dare to because of the devastating response. But I do not agree with this idea. If a war breaks out on the Korean peninsula the North's main target will be the U.S. forces based in South Korea and Japan which is the reason that the North has been working furiously on its missile programs. Kim Jong Il believes that if North Korea brings 20,000 American casualties in the region it would win the war.<sup>5</sup>



## **Scenario: War in North Korea**

The escalation of tensions on the Korean peninsula is perhaps the single greatest concern to senior U.S. leaders. Experts have postulated that war in Korea would be several times as devastating as Desert Storm. The unforgiving terrain and the unpredictable adversary would lead to full scale and lengthy war with unprecedented casualties. The majority of North Korean combat forces are positioned near the Demilitarized Zone. In an all out war North Korea would launch a coordinated air, land and sea attack beginning with artillery and mortar barrages from the HART sites located near the DMZ. From these positions the North Korean can range U.S. personnel as well as the capital city of Seoul. Heavy artillery, mortars and missiles would pound South Korea from the DMZ to Seoul. The North Korean ground force, formidable by itself, is augmented by 2,400 Multiple rocket launchers, 8,400 artillery pieces and 9,000 mortars. The Republic of South Korea with its 4,600 (75 artillery pieces in the U.S. Army) and 130 multiple rocket launch systems is heavily out-gunned.<sup>6</sup>

The concern for U.S. leadership is the ability to find and neutralize the North Korean artillery and mortar threat located in these hardened artillery sites. These positions, heavily fortified and difficult to locate, will allow the North Korean artillery to fire virtually at will against its adversary. These positions, located on the reverse slope of the extremely mountainous terrain along the DMZ, will allow the North Koreans to fire and then take cover in the mountain. The positions are also partially covered with reinforced concrete revetments making them almost impervious to indirect counter fire. These positions resemble the Chinese positions used in the Korean War as figure 3 indicates.



**Figure 3 Example of Reverse Slope Firing Position with Revetment**

Not only have the North Koreans maintained their resolve to reunify the country through the use of military force, they have also taken actions that would indicate these intentions. U.S. intelligence has confirmed the presence of hundreds of underground storage facilities constructed close to the DMZ that provide concealment for invading forces and supplies. The U.S. must develop and incorporate tactics, techniques and procedures to prevent the tactics of the North Koreans to hinder our success, by preventing effective use of our superior air power against targets in North Korea.

### Notes

<sup>1</sup> The Emerging Strategic Environment and the Relevance of Ground Forces, Defense Report, AUSA Institute of Land Warfare, on-line, Internet, 20 January 2000, 18 January 2000, <http://www.ausa.org/landwar/item/views/defense974.html>, 1

<sup>2</sup> Global Threats to the United States and its Interests Abroad, Statement of LTG Patrick M. Hughes, USA, Director DIA, 22 February 1996, 24 January 2000, on-line, Internet, [http://www.fas.org/irp/congress/1996\\_hr/s960222h.htm](http://www.fas.org/irp/congress/1996_hr/s960222h.htm), p 1.

<sup>3</sup> "Explosion" refers to North Korea's exacting its will outwardly against its military foes.

<sup>4</sup> Global Threats to the United States and its Interests Abroad, Statement of LTG Patrick M. Hughes, p 6.

<sup>5</sup> 1997 Congressional Hearings, Ju-Hwal Choi, Former Official Ministry of the People's Army of North Korea, 21 October 1997, on-line, Internet, 6 Mar 2000, [http://www.fas.org/spp/starwars/congress/1997\\_h/s971021choi.htm](http://www.fas.org/spp/starwars/congress/1997_h/s971021choi.htm).

<sup>6</sup> North Korea. Periscope, 1 July 1999, on-line, Internet, 3 February 2000, available at <http://www.periscope.ucg.com/nations/asia/northkor/army/index.html>.

## **Part 5**

### **Conclusions**

*Only the dead have seen the end of war.*

—Plato

Subterranean structures present a significant challenge to U.S. forces. The U.S. military, specifically the Air Force, must develop a sound and effective strategy in order to engage subterranean structures that will inevitably be faced in the future. The strategy for future wars during which the U.S. will face subterranean structures should be to locate and assess the structure.

### **Target Location and Assessment**

#### **Target Location**

As evidenced in the past, target location and assessment may be the most difficult step in the process. As the past has shown, location has proven to be very difficult. The Marines on Peleliu virtually walked upon the concealed openings of the tunnels and were gunned down at point blank range. This is not the most effective technique of locating the underground structures. Current systems such as the E-8C JSTARS (Joint Surveillance Target Attack Radar System). are designed to detect moving target indicators (MTI). These systems are inadequate for identifying

underground structures (UGFs) and would not have helped the Marines on Peleliu or the "tunnel rats" in Cu Chi.

Technological advances have changed the very nature of war and how it is waged. Several capabilities have allowed target identification and location to become state of the art. The identification of possible targets begins with situational awareness. Situational awareness will enable U.S. forces to identify targets through the use of Intelligence, Surveillance and Reconnaissance (ISR) assets and then destroy them with precision weapons early in a conflict.

ISR assets which are part of a system of inter-linked sensors pass real-time information to the "shooters". These ISR assets include JSTARS, AWACS (Airborne Warning and Control System) and Rivet Joint (the system that tracks electronic signals). They have the ability to locate targets from high altitude in order to allow engagement. Identification of the subterranean fortification as may be impossible with existing systems. In the future advancements in locating and targeting will possibly incorporate the use of unmanned aerial vehicles (UAVs) and unattended ground sensors to monitor and locate underground bunkers or storage facilities. Once the coordinates are determined these coordinates are passed in real-time to shooters capable of delivering the precise weapon at the right place at the right time.

### **Assessment**

During this process the subterranean structure, once located, must be assessed in order to establish the strength of the fortification. The terrain must also be evaluated so that the targeting personnel can gain an understanding of the vulnerabilities of the structure, in relation to the ground. The sand and softer ground of the Middle East must be targeted differently than the terrain in North Korea. The terrain in North Korea is made up of hardened rock and is much more survivable to precision attack.

Subterranean structures must be evaluated in terms of weather, climate, soil, vegetation, topography and populations. All of these elements will play a critical role when determining the most effective weapon needed in order to engage the structure. Some structures are simple structures. For example, earth and berm structures are simple and can be easily destroyed with conventional munitions. Others below ground at a limited depth can be destroyed with penetration bombs, which can produce catastrophic kills. The challenge lies in the targets buried deeply or in tunnels at an unlimited depth where the only evidence above the ground are the portal areas, vents or supporting structures. Since these are the most difficult to locate the supporting structures may be targeted in order to effectively attain a "functional kill" of the subterranean structure.

### **Destruction**

After the location and assessment of the target has taken place, the task at hand is to destroy the subterranean structure. In an article written by Colonel Philip P. Meilinger, ten propositions of airpower are defined. Although the propositions are valid, they fail to account for several aspects of past warfare and do not apply wholly across the board.

Meilinger's first proposition is, "Whoever controls the air generally controls the surface". He cites the fact that no American has been killed by air attack since 1953 and that the Army's doctrine assumes friendly air superiority.<sup>1</sup> This proposition, although generally true, as history shows would not have been true in the Pacific Theater during World War II, especially on the Islands of Peleliu and Okinawa. American Air forces controlled the airspace; however, the control on the ground was anything but in the hands of the Marines assaulting the tunnels and gun emplacements. An additional argument may be made as to whether air superiority the U.S. forces expect to achieve in Korea, should another war erupt there, will foster control on the

ground. Especially since U.S. weapons can not silence the artillery and mortars of the North Koreans.

Technology allows for the development of weapons capable of penetrating subterranean fortifications. Precision weaponry is the key to the destruction of the subterranean structures that will be confronted by U.S. forces in the future. By taking full advantage of its technological superiority the U.S. can effectively seal the target. Several advancements in precision weapons have produced such weapons as the Wind Corrected Munitions Dispenser (WCMD), the Sensor Fused Weapon (SFW), the Brilliant Antiarmor Submunition (BAT), the Conventional Air-Launched Cruise Missile (CALCM), the Joint Standoff Weapon (JSOW), the Joint Air-to-Surface Standoff Missile (JASSM) and the Joint Direct Attack Munition (JDAM)<sup>2</sup> Each of these weapon systems when incorporated into the "sensor" to "shooter" system can be effectively employed against subterranean structures; however, with the subterranean fortifications moving farther and farther into the Earth these weapons become less and less effective.

As precision based weapons become more prevalent in war the definitions of what constitutes destruction may have to change. Take for example Operation Allied Force in which one Air Force officer claimed 99.6 percent of the 20,000 bombs dropped hit their target. This could mean that a fighter-bomber got most of its ordnance within the confines of a large complex. Because of this definition and the more precise targeting abilities of the on-board computers more bombs were dropped with accuracy, but to say that each bomb hit its intended target would be inaccurate.<sup>3</sup> To put it more succinctly precise does not equal accurate, as evidenced by the B-2 sortie dropping its ordnance precisely on the intended but inaccurate target...the Chinese embassy.

Precision weapons and the ability to employ them will allow the U.S. the ability to destroy targets mitigating the collateral damage and civilian casualties while at the same time creating devastating psychological effects within the enemy. Interviews after Desert Storm indicate the effect of precision engagement. The following quote was taken from an Iraqi General as he reflected on the war.

During the Iran war my tank was my friend because I could sleep in it. I knew I was safe. During this war my tank became my enemy...none of my troops would get near a tank at night because they just kept blowing up.

This sentiment demonstrated that effects-based strategy rather than an annihilation-based strategy could control an adversary, without destroying him. We have seen that as war evolves it becomes more of incapacitating things or capabilities rather than killing people. The strategy of the U.S military should be one of achieving this dominant maneuver through the use of technology (locating the subterranean structure) and then destroying it through the use of precision weapons rather than the saturation bombing of the past.

### **Bomb Damage Assessment**

After the structures have been located assessed and engaged (munitions delivered) the final step is to assess the level of destruction or calculate the Bomb Damage Assessment (BDA). Platforms, both ground and airborne, can be used to ensure that the intended effect of the precision munition has been achieved. During the effects assessment of the engagement criteria the planners determine the extent to which the target must be engaged. The observation phase will determine if a catastrophic kill or a functional kill of the structure has been achieved and the commander's guidance met. During the targeting process the assessment of BDA is critical. A successful engagement and target destruction based on the commander's guidance must be

confirmed either positively or negatively. A negative confirmation reinstates the target to the plan for destruction and must be reengaged.

Perhaps Sir Winston Churchill observed the problem of collecting BDA best when he said, "Air power is the most difficult of all forms of military to measure, or even to express in precise terms."<sup>4</sup> In Vietnam, during Operation Commando Hunt V, the Air Force claimed a whopping 16,266 trucks destroyed and 4,700 damaged within a six month period. When the CIA countered that North Vietnam was not supposed to possess more than 10,000 trucks in all of North Vietnam and Laos combined the Air Force was forced to reassess the criteria used in its determination.<sup>5</sup> Again, there are problems with definitions. More recently in Kosovo, during Operation Allied Force, the claimed BDA of 110 tanks and self-propelled artillery pieces, 210 armored personnel carriers and 449 mortars and towed artillery pieces was actually 26 tanks destroyed, 12 armored personnel carriers and 8 mortars according to a US News and World Report article published after the war. NATO's military leadership rebutted the findings. Again, there are problems with the definitions.

The effect of air power is only as good as the tactics, techniques and procedures used in conjunction with it. Subterranean warfare and the depth great depth our adversaries will burrow into the Earth has yet to be addressed in any Air Force doctrine. The weapons being developed today have been said to have the capability to penetrate tons of steel and concrete. Meilinger's fourth proposition states, "In essence, air power is targeting, targeting is intelligence, and intelligence is analyzing the effects of air operations." The Gulf War showed that digging deeply and using tons of steel and concrete will not guarantee protection for precision penetrating bombs<sup>6</sup>. Future enemies will have witnessed the destruction in the Gulf and will continue to dig



deeper, possibly well over three hundred feet. The Air Force currently has no capability to effectively penetrate that deep.

#### Notes

<sup>1</sup> Philip P. Meilinger, Ten Propositions Regarding AirPower, School of Advanced Airpower Studies (SAAS), Maxwell AFB, Alabama, on-line, Internet, 6 March 2000, <http://www.airpower.maxwell.af.mil/airchronicles/cc/meil.html>

<sup>2</sup> Counterforce: Locating and Destroying Weapons of Mass Destruction, Report to the President of the United States, 31, March 1998, on-line, Internet, 24 January 2000, <http://www.usafa.af.mil/inss/ocp21.htm>.

<sup>3</sup> Earl H. Tillford, *Operation Allied Force and the Role of Airpower*, Parameters, U.S. Army War College, Vol XXIX, no 4, p 24.

<sup>4</sup> Ronald R Fogelman, *Air Power in the 21<sup>st</sup> Century*, Speech given to the International Defense and Security Symposium, Santiago, Chile, 12 March 1996, on-line, Internet, [http://www.af.mil/news/speech/current/Air\\_Power\\_in\\_the\\_21st\\_Century.html](http://www.af.mil/news/speech/current/Air_Power_in_the_21st_Century.html).

<sup>5</sup> Tillford, pg 33

<sup>6</sup> Meilinger, pg 6

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